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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/801,825	03/09/2001	Yasuhiko Kojima	P 276646	1431
909	7590	03/03/2006	EXAMINER	
PILLSBURY WINTHROP SHAW PITTMAN, LLP P.O. BOX 10500 MCLEAN, VA 22102			EL ARINI, ZEINAB	
			ART UNIT	PAPER NUMBER
			1746	

DATE MAILED: 03/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/801,825

Applicant(s)

KOJIMA ET AL.

Examiner

Zeinab E. EL-Arini

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-5,7-9,17-19,21-23,28,31 and 32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-5,7-9,17-19,21-23,28, and 31-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

### DETAILED ACTION

The amendment and remarks filed 12/14/05 have been acknowledged and entered.

#### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1, 3-5, 7-9, 17—19, 21-23, 28, and 31-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, “of cleaning for removing” is indefinite and confusing term.

In claim 21, line 2, “the material”, at line 4, “reacting the copper”, and at line 5, “the copper complex” are all without proper antecedent basis.

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1, 3-5, 7-9, 17-19, 21-23, 28, and 31-32 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification, as originally filed, does not provide support for “reducing a pressure in the chamber, the third pipe, and the vaporizer” as claimed in claim 1.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-5, 7-9, 17-19 and 21-23, 28 and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen et al. (US 2001/0009154 A1) in combination with Ivankovits et al. (5,213,621) and Senzaki et al. (6,090,960).

Nguyen et al. disclose a method for cleaning the interior surfaces of metal-organic chemical vapor deposition chamber. The reference discloses oxidizing the metal deposition byproducts on the surface to be cleaned, introducing cleaning vapor into the chamber to volatilize the oxidized metal deposition byproducts, and removing the deposition byproducts, the chamber (claim 5), heating the wall, and the temperature (claims 28-30) as claimed. See the abstract, Figs. 1-3, and the claims. The reference does not teach the subliming the metal complex on the heated wall under a reduced pressure, the exhausting step, the vaporizer and the piping as claimed. Nguyen et al. do not disclose the repeating and the confirming steps as claimed.

Ivankovits et al. as discussed supra in paper No. 082404 disclose a process comprises contacting the surface to be cleaned with an effective amount of cleaning agent comprising partially halogenated or fully halogenated linear or branched carboxylic acid, at a temperature sufficient to form volatile metal-complexes on the

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surface of the substrate to be cleaned. The volatile metal-complexes are sublimed from the surfaces of the substrate providing a clean, substantially residue-free surface. The reference teaches the cleaning agent, (claims 3, 4), the metal (copper), and the additive includes oxygen (claims 7, 8), The temperature (claim 18) and the pressure (claim 19). See the abstract, col. 2, lines 37-63, col. 2, line 67- col. 7, line 27, and the claims.

It would have been obvious for one skilled in the art to use the subliming and forming a metal complex steps taught by Ivankovits et al. to clean the chemical vapor deposition equipment or the physical vapor deposition equipment of Nguyen et al , because said vapor deposition equipment are made of quartz which is crystallized silicon oxide, and the substrates taught by Ivankovits et al. include, but are not limited to silicon, silicon oxide,----, which is functionally equivalent to the Nguyen et al. chamber and the substrate inside the chamber . This is also because Nguyen et al. also disclose cleaning the chamber and cleaning the substrate inside the chamber. One skilled in the art would repeat the steps to obtain optimum results.

Nguyen et al. and the Ivankovits et al. do not disclose the copper material, and the vaporizer and the heating step as claimed.

Senzaki et al. disclose a method of applying chemical vapor deposition copper to integrated circuit substrates using a precursor, and the vaporizer and the piping as claimed. See the abstract, col. 4, lines 1-22, col. 7, lines 17-31, Fig. 6 and claims 1, 10.

It would have been obvious for one skilled in the art at the time applicants invented the claimed process to use the copper and the vaporizer taught by Senzaki et al. in the Nguyen et al. in combination with Ivankovits et al. to obtain the claimed process. This is

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because it is known in the art to use the copper material as claimed in the chemical vapor deposition chamber. This is also because it is well known in the art to use the vaporizer for vaporizing the treating agent (copper) and the cleaning agent (carboxylic acid) in a method of processing a substrate. See Senzaki et al., Fig. 6, col. 6, lines 38-53. Heating the pipes entered the vaporizer is inherent in the Senzaki et al. process.

### ***Response to Arguments***

3. Applicant's arguments filed 12/14/05 have been fully considered but they are not persuasive. Applicant's argument with respect to Nquyen is unpersuasive, because the process as claimed does not exclude oxidizing the surface to be cleaned.

4. With respect to applicant argues that Nquyen discloses a method of cleaning interior surfaces of a metal vapor deposition chamber, and the Ivankovits is directed to cleaning a substrate. Applicant's argument is unpersuasive, because in both reference, the interior of the chamber will be cleaned during cleaning the substrate.

### ***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

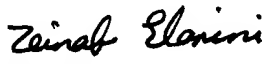
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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeinab E. EL-Arini whose telephone number is (571) 272-1301. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Zeinab E. EL-Arini  
Primary Examiner  
Art Unit 1746

ZEE

02/28/06